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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/942,200

08/29/2001

Eugene P. Marsh

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03/08/2006

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EXAMINER

NGUYEN, JOSEPH H

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,200

Applicant(s)

MARSH, EUGENE P.

Examiner

Joseph Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23,25-27,30-34,37 and 41-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23,25-27,30-34,37 and 41-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23, 25-27, 30-34, 37, 42, 44-45, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters et al. (US 5,744,832).

Regarding claims 23, 27, 32 and 37, Wolters et al. discloses in figure 6 substantially all the structure set forth in the claimed invention (See previous Office Action mailed on 11/10/2005). Wolters et al. does not disclose the value of x is in the range of about 0.90 to about 0.98. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wolters et al. by having the value of x being in the range of about 0.90 to about 0.98, since it has been held that where the general conditions of a claim are disclosed in the prior art discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claims 25 and 49, Wolters et al. discloses substantially all the structure set forth in the claimed invention except the value of x being about 0.95. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wolters et al. by having the value of x being about 0.95,

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since it has been held that where the general conditions of a claim are disclosed in the prior art discovering the optimum or working ranges involves only routine skill in the art.

In re Aller, 105 USPQ 233.

Regarding claim 26, Wolters et al. discloses the portion of the surface is a silicon-containing surface (col. 7, lines 40-41).

Regarding claims 30-31, Wolters et al. discloses in figure 6 at least one of the first electrode and second electrode comprises the barrier layer 111 of platinum (x): ruthenium alloy (col. 7, lines 13-14), and one additional conductive layer 110 is formed from material selected from the group of metal alloy (col. 7, lines 12-13).

Regarding claims 33-34, Wolters et al. discloses in figure 6 the capacitor includes a first electrode 11 formed relative to a silicon containing region 5 (col. 7, lines 39-41) of the at least one active device 1; a dielectric material 12 (col. 4, line 63) on at least a portion of the first electrode; and a second electrode 13 on the dielectric material, wherein the first electrode 11 comprises the barrier layer 111 formed of platinum (x): ruthenium alloy which includes one additional conductive layer 110 (col. 7, lines 12-14).

Regarding claims 42 and 47, Wolters et al. discloses in col. 6, lines 6-12 a layer of 200 nm (2000A) platinum/ruthenium is provided on the surface of the semiconductor body, and this layer is sputtered and eventually sputtering process will deposit alternatively a ruthenium and a platinum layer of approximately 1 to 1.5 nm (10-15A). As such, Wolters et al. teaches a thickness of the barrier layer is in a range of about 10A to about 10,000A.

Regarding claim 44, Wolters et al. discloses in figure 6 the substrate assembly 3 comprises at least one active device 1 (col. 4, line 60).

Regarding claim 45, the term "chemical vapor deposited" is merely product by process. Therefore, a chemical vapor deposited barrier layer does not structurally distinguish from the barrier layer 111 of Wolters et al.

Claims 41 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters et al. in view of Bronner et al. (US 6,177,696).

Regarding claims 41 and 46, Wolters et al. discloses in figure 6 substantially all the structure set forth in the claimed invention except a substrate assembly comprising a small high aspect ratio opening. Applicant teaches in page 14, lines 15-21 of the instant application a small high aspect ratio opening is the one in which the width is less than about 1 micron and the depth is larger than the width. Bronner et al. teaches in col. 4, lines 30-45 that the opening (trench) 1 formed within a structure including a semiconductor substrate and that the opening has the depth of about 6 microns and the width of about 0.175 micron. Therefore, Bronner et al. teaches the substrate comprising a small high aspect ratio opening. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wolters et al. by having a substrate assembly comprising a small high aspect ratio opening for the purpose of increasing the amount of charges stored per semiconductor substrate surface area (col. 1, lines 39-42, Bronner et al.).

Claims 43 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolters et al. in view of Sandhu et al. (US 5,335,138).

Regarding claims 43 and 48, Wolters et al. discloses in figure 6 substantially all the structure set forth in the claimed invention except the thickness of the barrier layer being about 100A to about 500A. However, Sandhu et al. teaches in col. 5, lines 60-62 the thickness of the barrier layer 42 is about 10nm (100A) to about 500nm (5000A), which has its lower limit in the claimed range. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wolters et al. by having the thickness of the barrier layer being about 100A to about 500A to provide a thinner barrier layer in a cost effective way, which still achieves the desired properties of the barrier layer.

Response to Arguments

Applicant's arguments filed on 02/09/2006 have been fully considered but they are not persuasive.

With respect to claims 23, 27, 32 and 37, applicant argues Wolters et al. indicates that the layer 111 contains "more than 15% ruthenium" to be effective (col. 5, lines 31-34) and that Wolters et al. shows a layer having more than 85 atomic percentage platinum results in the formation of the undesirable tungsten oxide layer. In other words, Wolters et al. teaches away from the present invention (atomic percentage platinum about 90 to about 95) by suggesting using a layer of having less than 85 atomic percentage platinum. However, Wolters et al. merely teaches platinum contains

more than 15 atom % of a metal capable of forming a conductive metal oxide (col. 5, lines 31-34). Further, Wolters et al. only shows in figure 2 the layer 11 comprises platinum, given an atomic percentage of approximately 10% ruthenium in platinum after heat treatment of 1 hour at 550C in an N₂/O₂ atmosphere (col. 5, lines 49-52).

Therefore, Wolters et al. never teaches platinum *should not* contain less than 15 atom % of metal. As such, it would have been obvious at the time of the present invention to modify Wolters et al. by having the value of x being about 0.95, since it has been held that where the general conditions of a claim are disclosed in the prior art discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN
March 3, 2006.

A handwritten signature in black ink, consisting of a stylized 'K' followed by a horizontal line extending to the right.

KENNETH PARKER
SUPERVISORY PATENT EXAMINER